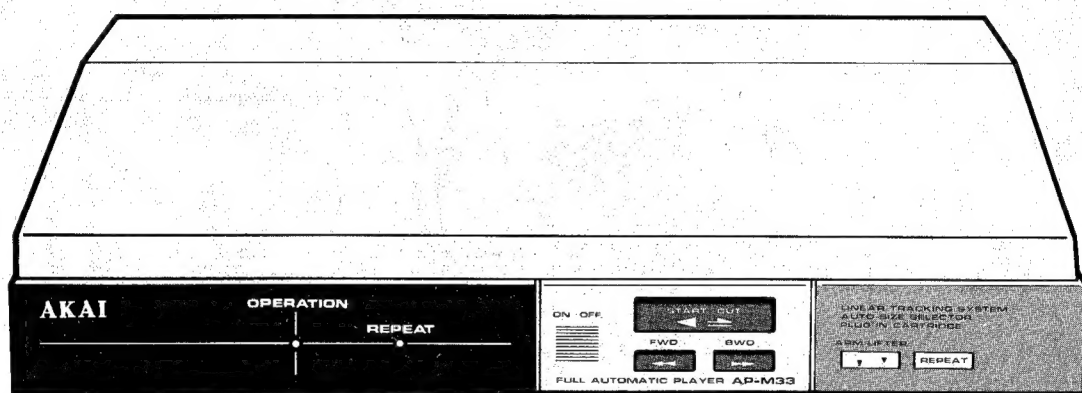


# AKAI SERVICE MANUAL

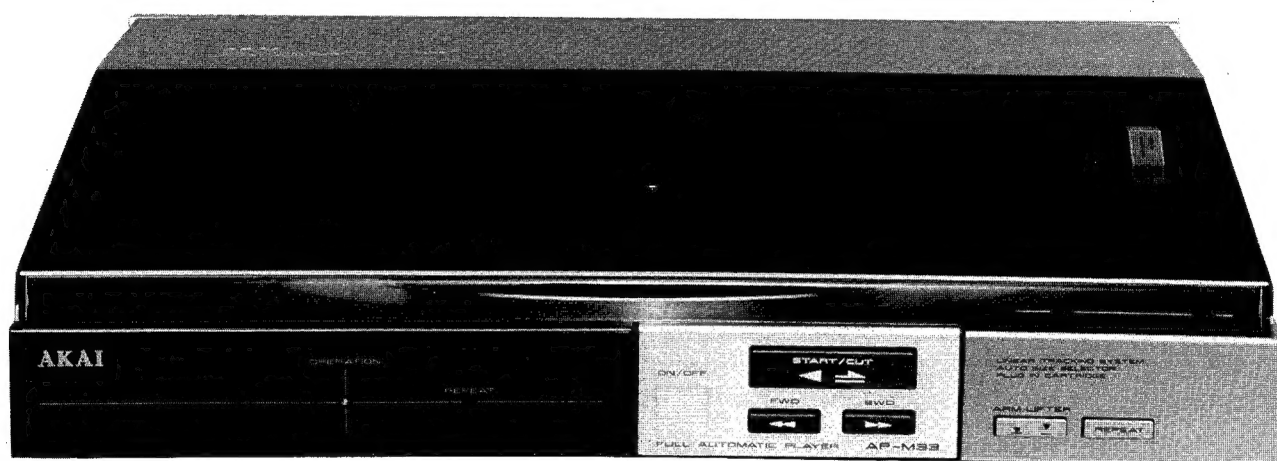


FULL AUTOMATIC PLAYER

MODEL **AP-M33**

## ABBREVIATIONS FOR SERVICE MANUAL MODEL AP-M33

ABBREVIATION	EXPLANATION
A.M	Arm Motor
BWD	BackWarD
EX	EXternal
FWD	ForWarD
"H"	High (Referring to voltage)
"L"	Low (Referring to voltage)
LED	Light Emitting Diode
M.M	Main Motor
PTR	Photo TRansistor
S/C	Start/Cut
SENS	SENSor (or SENSitivity)
VM	Variable Magnet



## **FULL AUTOMATIC PLAYER**

**MODEL AP-M33**

<b>SECTION 1</b>	<b>SERVICE MANUAL .....</b>	<b>3</b>
<b>SECTION 2</b>	<b>PARTS LIST .....</b>	<b>13</b>

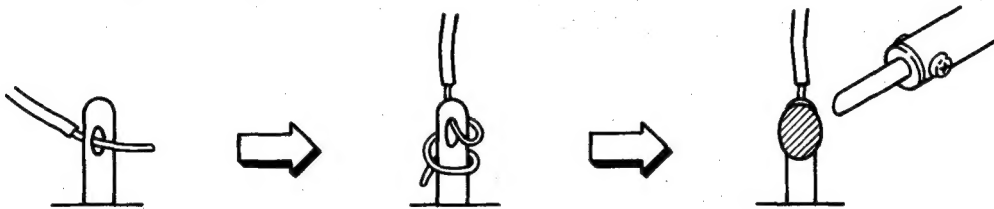
# SAFETY INSTRUCTIONS

## SAFETY CHECK AFTER SERVICING

Confirm the specified insulation resistance between power cord plug prongs and externally exposed parts of the set is greater than 10 Mohms, but for equipment with external antenna terminals (tuner, receiver, etc.) and is intended for [C] or [A], specified insulation resistance should be more than 2.2 Mohms (ground terminals, microphone jacks, headphone jacks, line-in-out jacks etc.)

## PRECAUTIONS DURING SERVICING

1. Parts identified by the  $\Delta$  symbol parts are critical for safety.  
Replace only with parts number specified.
2. In addition to safety, other parts and assemblies are specified for conformance with such regulations as those applying to spurious radiation. These must also be replaced only with specified replacements.  
Examples: RF converters, tuner units, antenna selector switches, RF cables, noise blocking capacitors, noise blocking filters, etc.
3. Use specified internal wiring. Note especially:
  - 1) Wires covered with PVC tubing
  - 2) Double insulated wires
  - 3) High voltage leads
4. Use specified insulating materials for hazardous live parts. Note especially:
  - 1) Insulation Tape
  - 2) PVC tubing
  - 3) Spacers (Insulating Barriers)
  - 4) Insulation sheets for transistors
  - 5) Plastic screws for fixing microswitch (especially in turntable)
5. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.), wrap ends of wires securely about the terminals before soldering.



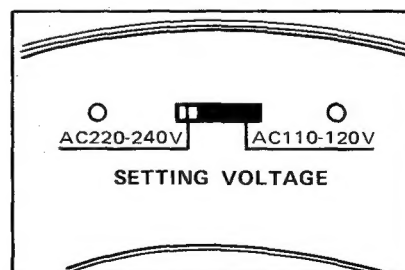
6. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.).
7. Check that replaced wires do not contact sharp edged or pointed parts.
8. Also check areas surrounding repaired locations.
9. Use care that foreign objects (screws, solder droplets, etc.) do not remain inside the set.

## VOLTAGE CONVERSION

Each machine is preset at the factory according to its destination, but some machines can be set to 110V–120V or 220V–240V as required. If your machine's voltage can be converted:

Before connecting the power cord or assembling the platter, turn the Voltage Selector located on the top of the cabinet with a screwdriver until the correct voltage is indicated. Models for Japan, USA, Europe, UK and Australia are not equipped with this facility.

**NOTE:** Cycle conversion is unnecessary since this model employs DC motors.



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## SECTION 1

# SERVICE MANUAL

### TABLE OF CONTENTS

I.	SPECIFICATIONS .....	4
II.	DISMANTLING OF UNIT .....	5
III.	CONTROLS .....	6
IV.	PRINCIPAL PARTS LOCATION .....	7
V.	DESCRIPTION OF OPERATION KEYS AND CONTROL SIGNAL .....	8
	5-1 SPECIFICATIONS OF VARIOUS OPERATING BUTTONS .....	8
	5-2 CONTROL SIGNAL SPECIFICATIONS .....	9
VI.	ADJUSTMENTS .....	10
	6-1 ORDINARY MECHANICAL ADJUSTMENT .....	10
	6-2 ELEVATION ARM POSITION ADJUSTMENT .....	10
	6-3 TRACKING SENSOR VOLTAGE ADJUSTMENT .....	10
	6-4 SPPED ADJUSTMENT .....	11
	6-5 LEAD-IN POSITION ADJUSTMENT .....	11
VII.	P.C BOARD TITLES AND IDENTIFICATION NUMBERS .....	12

For basic adjustments, measuring methods, and operating principles, refer to GENERAL TECHNICAL MANUAL.

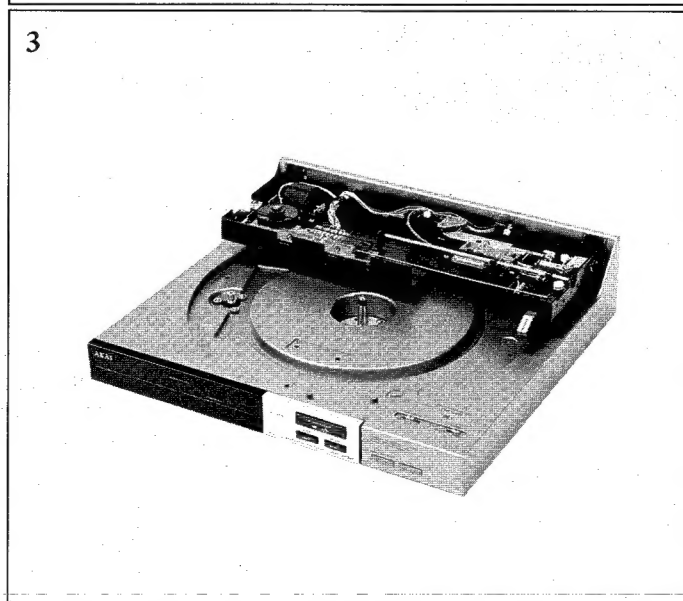
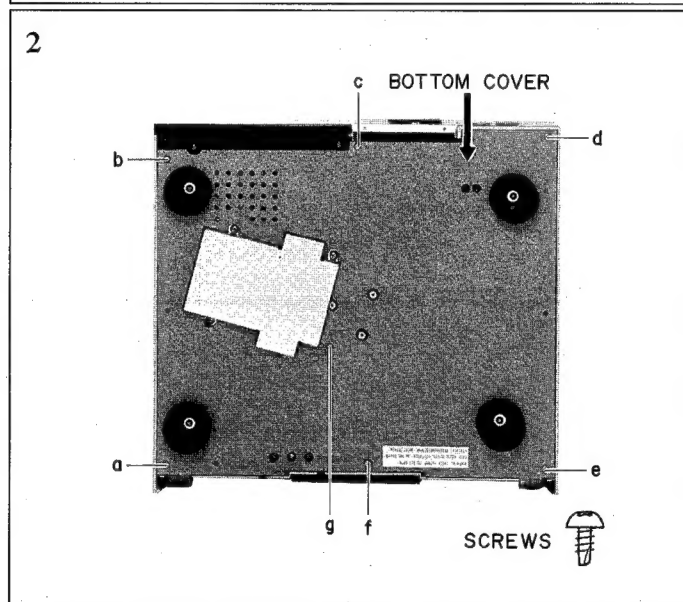
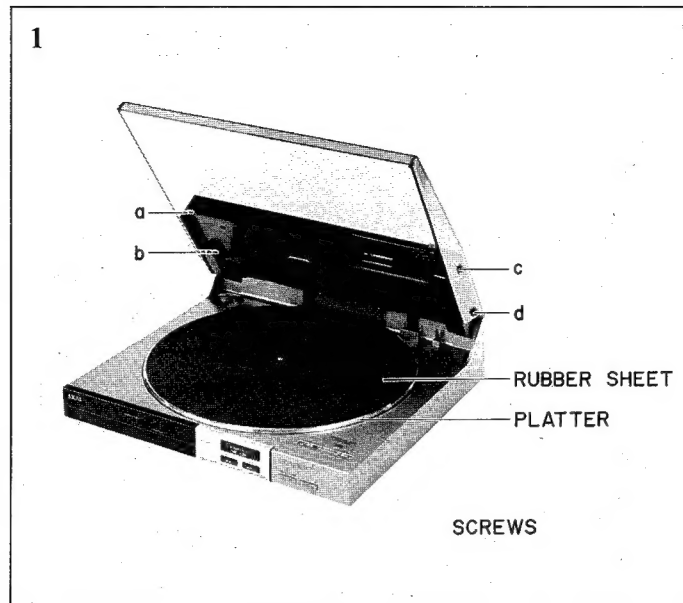
## I. SPECIFICATIONS

TURNTABLE (PLATTER)	Aluminum alloy diecast
DRIVE SYSTEM	Belt drive fully automatic
MOTOR	DC servo motor
SPEED	33-1/3 & 45 rpm
WOW & FLUTTER	0.04% (WRMS)
RUMBLE	70 dB (DIN-B)
TONEARM	Linear tracking dynamic balanced type
EFFECTIVE ARM LENGTH	90 mm
ARM LIFTER	Oil damped
OVER HANG	0 mm
CARTRIDGE (Not on Model AP-M33-S)	VM type (PC-33/T4P plug-in type)
OUTPUT VOLTAGE	3.5 mV
CHANNEL SEPARATION	20 dB
STYLUS	RS-33
OPTIMAL STYLUS PRESSURE	1.25 g (Pre-adjusted)
POWER REQUIREMENTS	100V, 50/60 Hz for Japan 120V, 60 Hz for USA & Canada 220V, 50 Hz for Europe except UK 240V, 50 Hz for UK & Australia 110–120V/220–240V, 50/60 Hz switchable for other countries
POWER CONSUMPTION	10W (A, C, J, U Models)
DIMENSIONS	350(W) × 90(H) × 320(D) mm (13.8 × 3.5 × 12.6 inches)
WEIGHT	4.0 kg (8.8 lbs)

\* For improvement purposes, specifications and design are subject to change without notice.

## II. DISMANTLING OF UNIT

In case of trouble, etc. necessitating dismantling, please dismantle in the order shown in the photographs. Reassemble in reverse order.



### III. CONTROLS

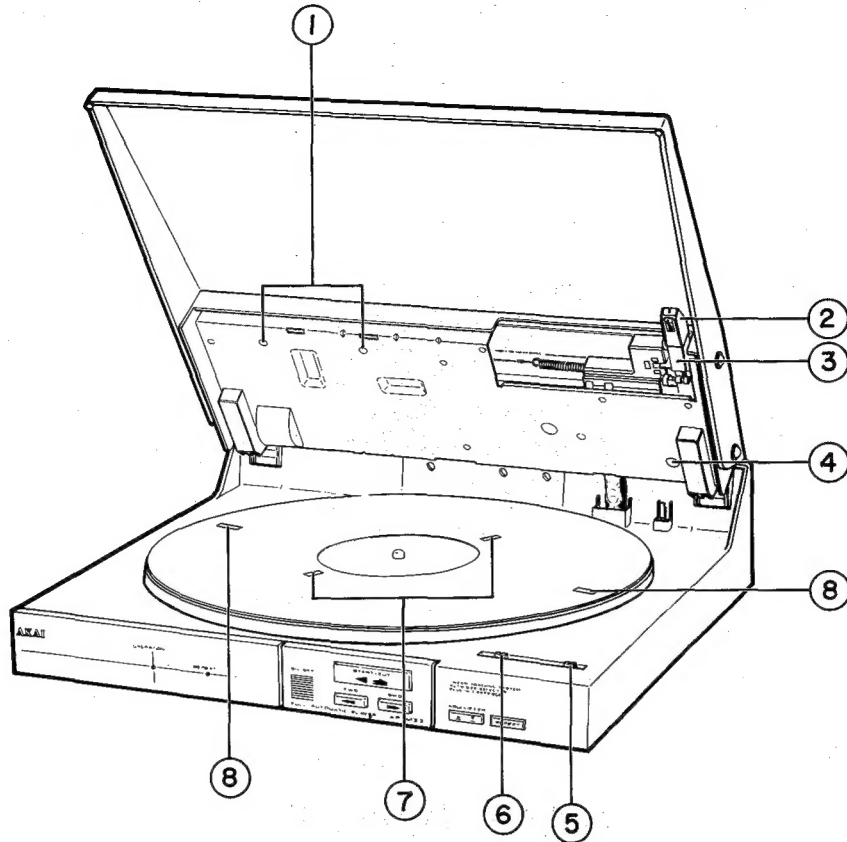


Fig. 3-1

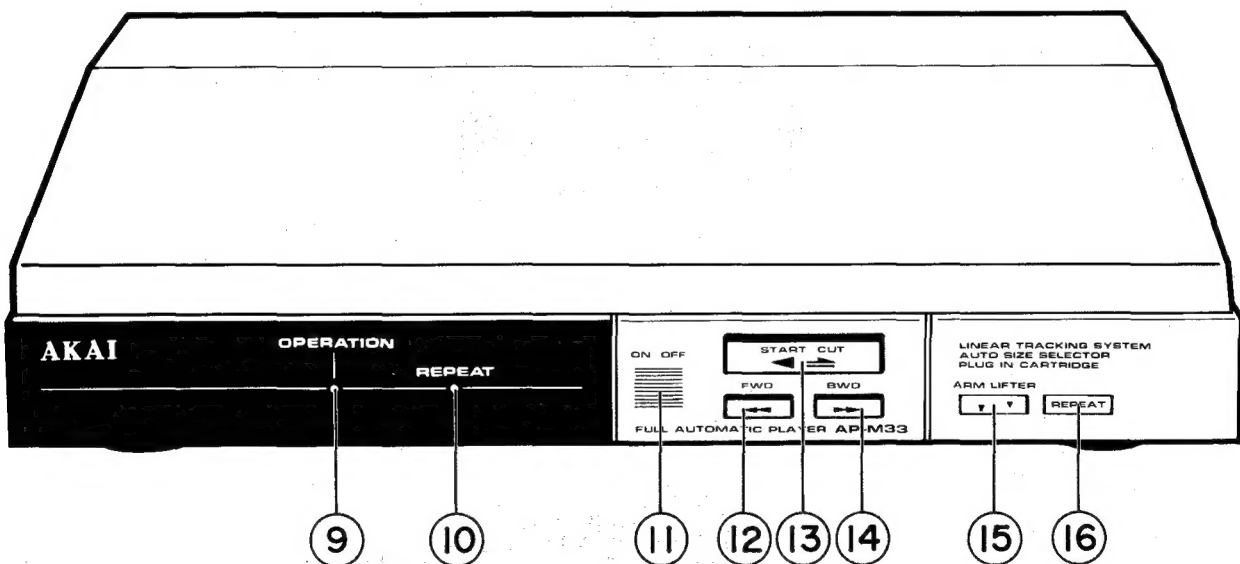


Fig. 3-2

- |   |                                       |
|---|---------------------------------------|
| 1. LEDS FOR RECORD SENSING                              | 9. OPERATION INDICATOR                |
| 2. CARTRIDGE PC-33 (W/STYLUS RS-33),<br>NOT ON AP-M33-S | 10. REPEAT INDICATOR                  |
| 3. TONE ARM   | 11. POWER ON/OFF SWITCH               |
| 4. STYLUS PRESSURE FINE-ADJUSTER HOLE                   | 12. FWD (◀) BUTTON                    |
| 5. MODE MANUAL/AUTO SELECTOR                            | 13. START (◀)/CUT (▶) BUTTON          |
| 6. SPEED 33/AUTO/45 SELECTOR                            | 14. BWD (▶) BUTTON                    |
| 7. RECORD SENSING SLIT (17 cm)                          | 15. ARM LIFTER UP (▼)/DOWN (▲) BUTTON |
| 8. RECORD SENSING SLIT (30 cm)                          | 16. REPEAT BUTTON                     |

## IV. PRINCIPAL PARTS LOCATION

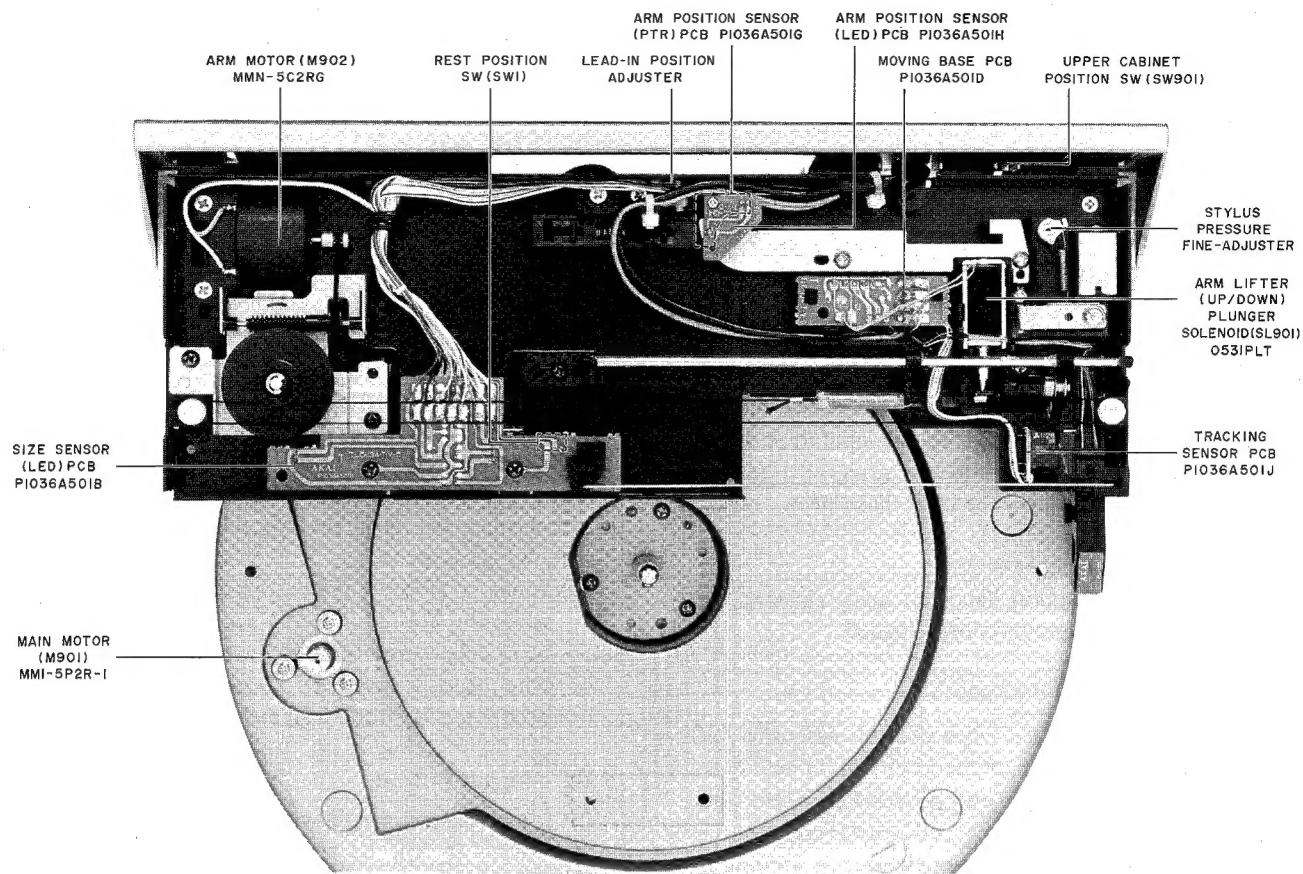


Fig. 4-1 Top View

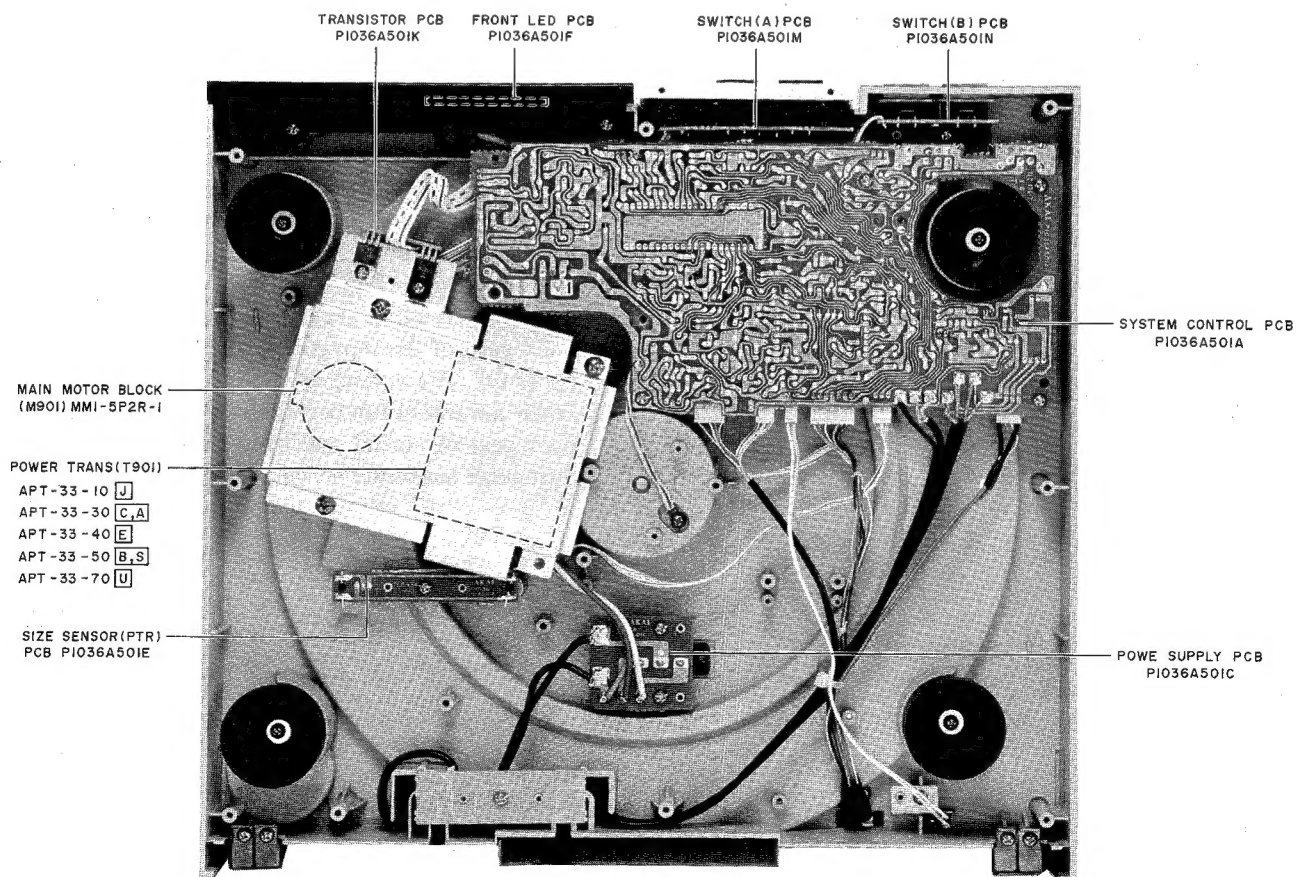


Fig. 4-2 Bottom View

## V. DESCRIPTION OF OPERATION KEYS AND CONTROL SIGNAL

### 5-1 SPECIFICATIONS OF VARIOUS OPERATING BUTTONS

#### 5-1-1 START/CUT Button

This key inputs the player auto-start and cut commands to the microcomputer (IC3: LM6405H-242). As described below, its function will vary in accordance with the player status at the time it is pushed.

- 1) "START" function when the arm is at its rest position and the main motor is off.
- 2) "CUT" function when the arm is at its rest position and the main motor is on.
- 3) "CUT" function when the arm is at other than its rest position.

In the following cases, however, no operation will be started when this key is pushed:

- 1) When the manual switch has been set at MANUAL.
- 2) When the dust cover is open.
- 3) When size detection has been made once and no record is judged to have been loaded.

#### 5-1-2 FWD and BWD Buttons

These keys will be used when the user wishes to shift the arm at will. Either of the keys will be held down for the duration of the arm movement. Their functions will vary in accordance with the player status at the time of pushing, as shown below.

- 1) Arm Lifted Mode  
→ Will forward (or shift backward) the arm for about one second first at a slow speed, and then at a fast speed (until the key is released).
- 2) Arm Lifting Mode  
→ When the arm is being lifted, will acknowledge no key input for 2 seconds.
- 3) Arm Lowering Mode and Arm Lowered Mode (Play Mode)  
→ Will lift the arm, and phase into the same behavior as 1).
- 4) Return (Auto Lead-Out/Cut) Mode  
→ The moment the key is pushed, will behave the same as 1).
- 5) Lead-In Mode  
→ The same as 4).

Only, when the dust cover is open, no arm movement will be engaged.

#### 5-1-3 Arm Lifter (Up/Down) Button

This key will be used when the user wishes to move the arm up or down at will. Its function will vary in accordance with the player status, as shown below.

- 1) Arm Lifted Mode  
→ Will lower the arm.
- 2) Arm Lifting Mode  
→ When the arm is being lifted, will acknowledge no key input for 2 seconds.
- 3) Arm Lowering Mode and Arm Lowered Mode (Play Mode)  
→ Will lift the arm.
- 4) Return (Auto Lead-Out/Cut) Mode  
→ Will acknowledge no key input.
- 5) Lead-In Mode (up to the lowering of the arm)  
→ Will acknowledge no key input.

Only, no lowering of the arm will be effected in the following cases:

- 1) When in an auto mode, the key has been pushed while the arm is located within an area recognized by size detection to hold no record.
- 2) When the key has been pushed while the arm is at its rest position or a lead-out position.

#### 5-1-4 Repeat Button

This key will be pushed when a repeat play is desired. However, it will be ineffective when the manual switch has been set at MANUAL. Its auto mode operational specifications are presented below.

- 1) Rest Position  
→ Will turn the "repeat" LED on (Repeat Acknowledgement).
- 2) Play Mode and Pre-Play Arm Shifting Mode  
→ Will turn the "repeat" LED on.
- 3) Play Cutting Mode  
→ Will acknowledge the repeat command when the arm is located in an area where a record exists. When it is located in an area devoid of a record, nothing will happen.
- 4) Arm Lifting or Lowering Mode  
→ Will turn the "repeat" LED on.

Each push of the repeat key will switch the function on or off. The number of repeats will be  $2^4 - 1 = 15$ . When no record has been detected in size detection, no repeat command will be acknowledged until the dust cover has been opened.

## 5-2 CONTROL SIGNAL SPECIFICATIONS

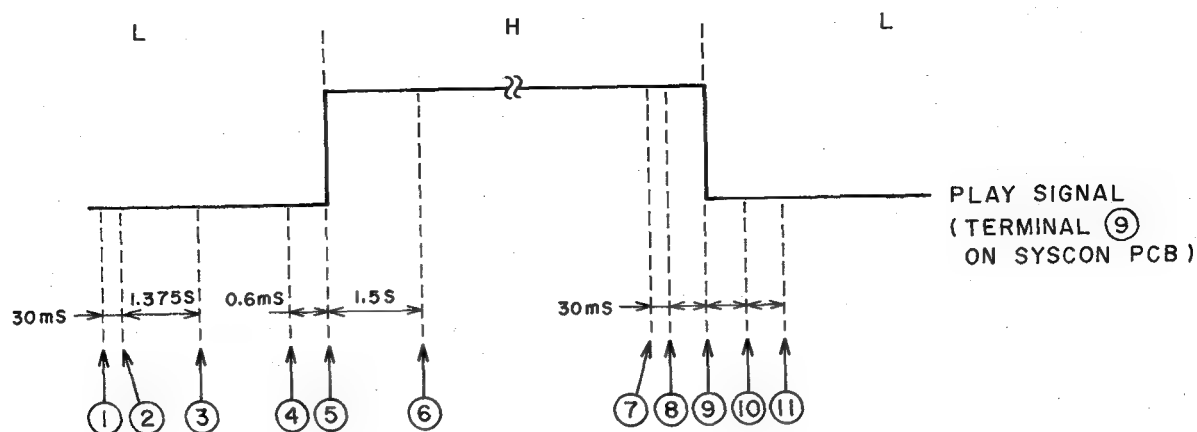


Fig. 5-1 Control (PLAY) Signal

1. START KEY INPUT
2. MAIN MOTOR ON
3. ARM MOTOR FWD
4. ARM MOTOR STOP
5. ARM DOWN START: PLUNGER (L)(H)→ON
6. ARM DOWN (JUDGED BY MICOM): PLUNGER (H)→OFF, MUTING→OFF, TRACKING SENSOR→ON

7. CUT/CUT KEY INPUT
8. MUTING→ON
9. ARM UP START: PLUNGER (L)→OFF
10. TRACKING SENSOR→OFF
11. ARM UP (JUDGED BY MI-COM)

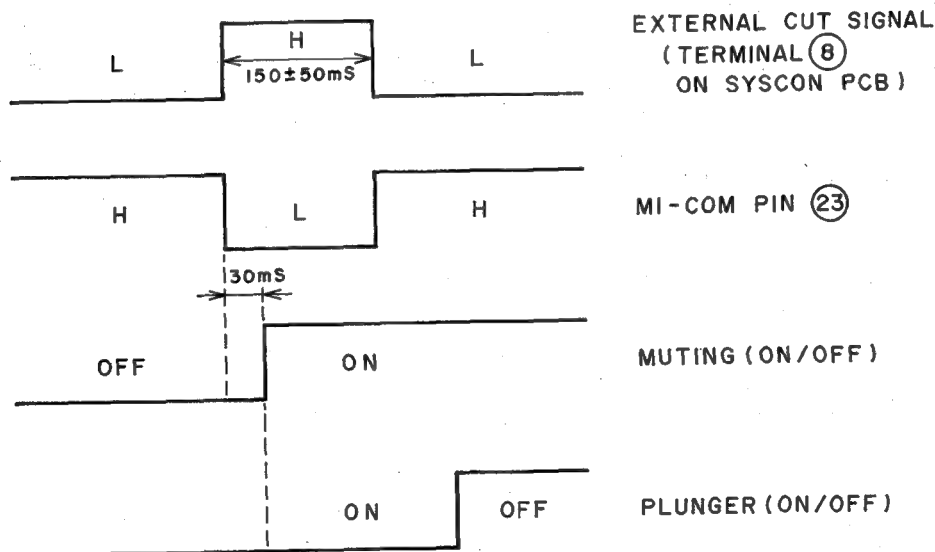


Fig. 5-2 Control (EXTERNAL CUT) Signal

### 1) Interface

Two signal lines with the receiver (AA-M33/L) have been provided to handle play signals transmitted by the player to the receiver and external cut signal transmitted by the receiver to the player.

### 2) Play Signal Specification

Will become "H" when the arm is lowered (that is, in a play mode).

### 3) External Cut Signal Specification

When a selector other than PHONO has been pushed at the receiver, an "H" signal will be sent out to the player, and via an interface (TR20) (logic inverter), will be transmitted inside the microcomputer as an "L" signal.

### 4) Signal Timing

Refer to Fig. 5-1 for PLAY signal, and Fig. 5-2 for EXTERNAL CUT signal.

## VI. ADJUSTMENTS

### 6-1 ORDINARY MECHANICAL ADJUSTMENT

- 1) Ordinary Mechanical Adjustments such as Stylus Pressure, Overhang and Tone Arm Height Adjustment are not necessary since this model is equipped with a Dynamic-Balance Linear Tracking Tone Arm and a VM cartridge with plug-in connector. (Any brands of cartridges with **TD** mark are applicable without any adjustments. However a cartridge which has the same output voltage (3.5 mV/1 kHz, 5 cm/sec peak) is recommended.
- 2) Stylus Pressure is pre-adjusted to 1.25 grams at the factory, and re-adjustment is not necessary in normal conditions.

However, the model is equipped with the Stylus Pressure Fine-Adjuster located below the Tone Arm section.

Adjust it only when, for some reason. (Temperature, etc.) the stylus skips or there is distortion in the sound.

Stylus Pressure can be adjusted from the minimum 0.5 grams (Adjuster-fully counter-clockwise) to the maximum 2.0 grams (Adjuster-fully clockwise) centering around 1.25 grams. In other words, Stylus Pressure can be adjusted within  $1.25 \pm 0.75$  grams by turning the adjuster clockwise of counterclockwise through an angle of about 45 degrees in each direction.

### 6-2 ELEVATION ARM POSITION ADJUSTMENT (Refer to Fig. 6-1)

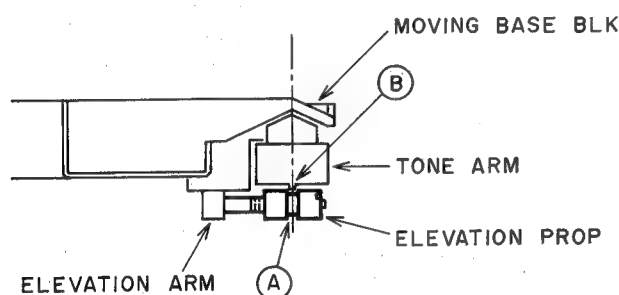


Fig. 6-1

- 1) This adjustment is not necessary unless the Elevation Prop is replaced or mis-adjusted.
- 2) Hold the Tone Arm with the Moving Base Block and separate the Elevation Prop from the Tone Arm.

Then, bring the Elevation Prop close to the Tone Arm, and adjust the Elevation Prop with a flat type screw-driver to the place where the position of the notch **A** on the Elevation Prop coincides with the projecting part **B** on the Tone Arm as shown in Fig. 6-1.

### 6-3 TRACKING SENSOR VOLTAGE ADJUSTMENT (Refer to Fig. 6-2)

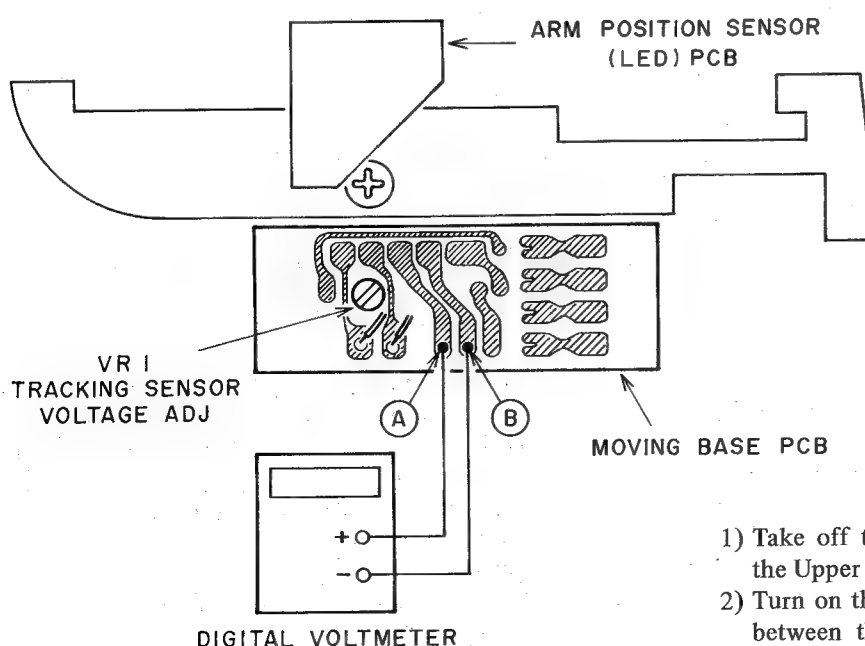


Fig. 6-2 Top View

- 1) Take off the Dust Cover and Chassis Cover from the Upper Chassis Assy by loosening 4 screws.
- 2) Turn on the power and connect a digital voltmeter between the points **A** (Terminal ③) and **B** (Ground) as shown in Fig. 6-2. Then adjust VR1 (20K) so that the voltage is  $3.0 \pm 0.1$  V.

#### 6-4 SPEED ADJUSTMENT (Refer to Fig. 6-3)

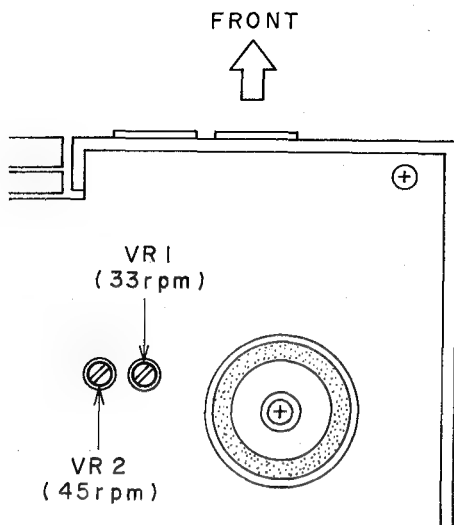


Fig. 6-3 Bottom View

##### Using a Test Record

- 1) Set the speed selector to 33 rpm.
- 2) Play the test record (33-1/3 rpm, 1000 Hz)
- 3) Adjust VR1 (10K) so that the speed is 1000 Hz  $\pm$  5 Hz.
- 4) Set the speed selector to 45 rpm.
- 5) Play the same record and adjust VR2 (5K) so that the speed is 1350 Hz  $\pm$  5 Hz.

##### Using a Stroboplate

- 1) Set the speed selector to 33 rpm.
- 2) Play the stroboplate and adjust VR1 so that the strobe (33 rpm, 50 or 60 Hz according to your area) stays still.
- 3) Set the speed selector to 45 rpm.
- 4) Play the stroboplate and adjust VR2 so that the strobe (45 rpm, 50 or 60 Hz) stays still.

#### 6-5 LEAD-IN POSITION ADJUSTMENT (Refer to Fig. 6-4)

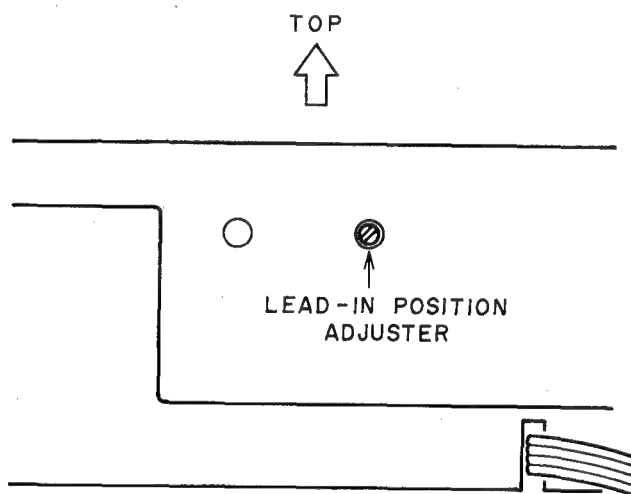


Fig. 6-4 Rear View

- 1) Place a 17 cm record on the platter and play in AUTO mode.
- 2) Confirm the position where the stylus descends.
- 3) If this Lead-in position is incorrect, it can be adjusted by turning the Lead-in Position Adjuster shown in Fig. 6-4 clockwise or counter-clockwise with a flat type screw-driver.  
Clockwise: To make the stylus descends away from the spindle.  
Counter-clockwise: To make the stylus descends towards the spindle.
- 4) The proper Lead-in position for a 30 cm record and Lead-out position for both 17 and 30 cm records will be automatically adjusted by above adjustment.

## VII. P.C BOARD TITLES AND IDENTIFICATION NUMBERS

---

P.C Board Title		P.C Board Number
System Control	P.C Board	P1036A501A
Size Sensor (LED)	P.C Board	P1036A501B
Power Supply	P.C Board	P1036A501C
Moving Base	P.C Board	P1036A501D
Size Sensor (PTR)	P.C Board	P1036A501E
Front LED	P.C Board	P1036A501F
Arm Position Sensor (PTR)	P.C Board	P1036A501G
Arm Position Sensor (LED)	P.C Board	P1036A501H
Tracking Sensor	P.C Board	P1036A501J
Transistor	P.C Board	P1036A501K
Switch (A)	P.C Board	P1036A501M
Switch (B)	P.C Board	P1036A501N

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SECTION 2

**PARTS LIST**

TABLE OF CONTENTS

RECOMMENDED SPARE PARTS .....	15
1. SYSTEM CONTROL P.C BOARD BLOCK .....	15
2. ASSEMBLY BLOCK .....	16
3. FINAL ASSEMBLY BLOCK .....	18
INDEX .....	20

Resistor and Capacitors which are not listed in this parts list, please refer to COMMON LIST FOR SERVICE PARTS.

## ATTENTION

1. When placing an order for parts, be sure to list the parts no., model no., and description. There are instances in which if any of this information is omitted, parts cannot be shipped or the wrong parts will be delivered.
2. Please be careful not to make a mistake in the parts no. If the parts no. is in error, a part different from the one ordered may be delivered.
3. Because parts number and parts unit supply in the Preliminary Parts List may be partially changed, please use this parts list for all future reference.

## HOW TO USE THIS PARTS LIST

1. This Parts List shows the parts that are considered necessary for repairs. Other parts, such as resistors and capacitors, are shown in the "Common List for Service Parts". Select and order such parts from the "Common List for Service Parts".
2. The Recommended Spare Parts shows those parts in the Parts List which are considered particularly important for service.
3. Parts not shown in the Parts List and "Common List for Service Parts" will not be supplied in principle.
4. How to read list

a) Mechanism Block

b) P.C Board Block

### 2. HEAD BASE BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
2-1x	BH-T2023A320A	HEAD BASE BLOCK GX-F66R
2-2	HP-H2206A010A	HEAD R/P PR4-8FU C
2-3	ZS-477876	PAN20x03STL CMT
2-4	ZS-536488	BID20x08STL CMT
2-5	ZG-402895	CS ANGLE ADJUST SPRING

SP (Service Parts) Classification

A small "x" indicates the inability to show that particular part in the Photo or Illustration.

This number corresponds with the individual parts index number in that figure

This number corresponds with the Figure Number

### 6. SYS. CON. P.C BOARD BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
6-1	BA-T2034A070A	PC SYS CON BLK GX-F44R
6-IC1	EI-324536	IC HD14049BP
6-IC2	EI-336801	IC MB8841-564M
6-IC3	EI-331661	IC SN7405N
6-IC4	EI-336725	IC M54527P
6-TR1to4	ET-200985	TR 2SC2603 F,G
6-TR5to28	ET-554657	TR 2SA733A P,Q
6-D1	ED-318292	D SILICON H 1S2473T-77 T26
6-D2to4	ED-308952	D GERMA V 1K34A-LR F07
6-D5to10	ED-318292	D SILICON H 1S2473T-77 T26
6-X1	EI-318384	OSC X'TAL NC-18C 3.579545MHZ

SP (Service Parts) Classification

This reference numbers corresponds with symbol numbers of Schematic Diagrams.

5. Both the kind of part and installation position can be determined by the Parts Number. To determine where a parts number is listed, utilize Parts Index at end of Parts List. It is necessary first of all to find the Parts Number. This can be accomplished by using the Reference Number listed at right of parts number in the Parts Index.

## WARNING

⚠ INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.

## AVERTISSEMENT

⚠ IL INDIQUE LES COMPOSANTS CRITIQUES DE SURETE. POUR MAINTENIR LE DEGRE DE SECURITE DE L'APPAREIL NE REMPLACER LES COMPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SECURITE QUE PAR DES PIECES RECOMMANDEES PAR LE FABRICANT.

## RECOMMENDED SPARE PARTS

Because, if the parts listed below are on hand, almost any repair can be accomplished, we suggest that you stock these Recommended Spare Parts Items.

NO.	PARTS NO.	DESCRIPTION
1	N BM-349286	MOTOR MMI-5P2R-1 D0.03 (M901)
2	N BM-349296	MOTOR MMN-5C2RG D1.2W (M902)
3	N BT-349291	Δ TRANS POWER APT-33-10 (J)
4	N BT-349293	Δ TRANS POWER APT-33-30 (C,A)
5	N BT-349294	Δ TRANS POWER APT-33-40 (E)
6	N BT-349295	Δ TRANS POWER APT-33-50 (B,S)
7	N BT-349292	Δ TRANS POWER APT-33-70 (U)
8	ED-337893	D LED SLP144D01 RED
9	ED-344464	D LED SLP145A RED
10	ED-337894	D LED SLP444D01 AMBER
11	N ED-349756	D LED SLR902A INFRARED
12	ED-344280	D SILICON H GMA-01-FY2 F05
13	ED-306724	D SILICON S5277B 100/1.0A
14	ED-322238	D SILICON 1B4B41 100/1.0A
15	ED-343996	D ZENER H HZ12 B1
16	ED-305704	D ZENER H HZ4 B2
17	ED-306012	D ZENER H HZ7 A3
18	ED-337266	D ZENER H HZ9 A1
19	N EF-300604	Δ FUSE FST3100 T 250V 1.00A (E,B,S)
20	EI-336761	IC LA6458S
21	N I-349271	IC LM6405H-242
22	EI-344461	IC TA75393S
23	EI-315243	IC TA78005P
24	EI-337017	OSC CE CSB800A 0.800000MHZ
25	N EP-349297	SOLENOID 0531PLT 10V
26	EQ-322437	RELAY LEAD LAB2NS 2NO 5V
27	ER-307565	Δ R FUSE ERD2FC S10 1/4W 6R8J
28	ES-336814	SW LEAF MSW-1150NBK 01-1 NO
29	ES-344473	SW PUSH SCL101T 1-01-02N
30	ES-337898	SW SLIDE ))120163 01-2 (U)
31	N ES-349277	SW SLIDE 00220872 2-02-02S
32	N ES-352307	SW SLIDE 00230904 2-02-03S
33	ES-336780	SW TACT KHH10902
34	ET-344472	PHOTO SENSOR ON1128AK
35	ET-337891	PHOTO SENSOR PH101
36	N ET-349755	PHOTO SENSOR SPS103
37	ET-337759	TR FET 2SK246 GR
38	N ET-325501	TR 2SA1015 O,Y
39	ET-347738	TR 2SA1282A E,F
40	ET-349272	TR 2SC3242A E,F
41	N ET-635231	TR 2SC536NP F,G
42	ET-338565	TR 2SD1302 R,S
43	N ET-349285	TR 2SD1406 Y
44	EV-336853	R S-FIX H KVSF807U 3P 103
45	EV-336847	R S-FIX H KVSF807U 3P 502
46	EV-344465	R S-FIX H TM8KV2-3S 3P 0.50W 203
47	MB-344538	BELT 1.2xD26.0CRHS60 S82M
48	N MB-353713	BELT 4.0x0.8TxD201CRHS60

"NOTE" N: New Parts

## SYMBOL FOR DESTINATION

A : AAL (U.S.A)  
 B : UK (England)  
 C : CSA (Canada)  
 J : JPN (Japan)  
 S : SAA (Australia)  
 U : U/T (Universal Area)  
 E : CEE (Europe)

## 1. SYSTEM CONTROL P.C BOARD BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
1-1U	BA-P1036A020A	PC SYSCON BLK AP-M33-C(U)
1-1J	BA-P1036A020B	PC SYSCON BLK AP-M33-C(J)
1-1C	BA-P1036A020G	PC SYSCON BLK AP-M33-C(C,A)
1-1E	BA-P1036A020C	PC SYSCON BLK AP-M33-C (E,B,S)
1-1SU	BA-P1036A020D	PC SYSCON BLK AP-M33-CS(U)
1-1SE	BA-P1036A020F	PC SYSCON BLK AP-M33-CS (E,B,S)

### SYSTEM CONTROL P.C BOARD

1-IC1	EI-344461	IC TA75393S
1-IC2	EI-336761	IC LA6458S
1-IC3	EI-349271	IC LM6405H-242
1-TR1,2	ET-635231	TR 2SC536NP F,G
1-TR3	ET-325501	TR 2SA1015 O,Y
1-TR4to7	ET-635231	TR 2SC536NP F,G
1-TR8	ET-337759	TR FET 2SK246 GR
1-TR9	ET-349272	TR 2SC3242A E,F
1-TR10	ET-347738	TR 2SA1282A E,F
1-TR11	ET-349272	TR 2SC3242A E,F
1-TR12	ET-347738	TR 2SA1282A E,F
1-TR13,14	ET-635231	TR 2SC536NP F,G
1-TR15,16	ET-325501	TR 2SA1015 O,Y
1-TR17to24	ET-635231	TR 2SC536NP F,G
1-TR25	ET-325501	TR 2SA1015 O,Y
1-TR26	ET-349272	TR 2SC3242A E,F
1-TR27,28	ET-338565	TR 2SD1302 R,S
1-TR29to32	ET-635231	TR 2SC536NP F,G
1-TR33	ET-338565	TR 2SD1302 R,S
1-TR34,35	ET-635231	TR 2SC536NP F,G
1-TR37	ET-347738	TR 2SA1282A E,F
1-TR38	ET-349272	TR 2SC3242A E,F
1-TR39to41	ET-635231	TR 2SC536NP F,G
1-D1	ED-305704	D ZENER H HZ4 B2
1-D2,3	ED-344280	D SILICON H GMA-01-FY2 F05
1-D4	ED-306012	D ZENER H HZ7 A3
1-D5to7	ED-344280	D SILICON H GMA-01-FY2 F05
1-D8	ED-337266	Δ D ZENER H HZ9 A1
1-D9	ED-343996	Δ D ZENER H HZ12 B1
1-D10	ED-322238	Δ D SILICON 1B4B41 100/1.0A
1-D11	ED-306724	D SILICON S5277B 100/1.0A
1-D12	ED-306724	D SILICON S5277B 100/1.0A (E,B,S)
1-D13	ED-306724	D SILICON S5277B 100/1.0A
1-SW7	ES-352307	SW SLIDE 00230904 2-02-03S
1-SW8	ES-349277	SW SLIDE 00220872 2-02-02S
1-RL1	EQ-322437	RELAY LEAD LAB2NS 2NO 5V
1-VR1	EV-336853	R S-FIX H KVSF807U 3P 103
1-VR2	EV-336847	R S-FIX H KVSF807U 3P 502
1-L1	EO-345922	COIL FIX 1 LAL03KH 470K
1-X1	EI-337017	OSC CE CSB800A 0.800000MHZ
1-FR1,2U	ER-307565	Δ R FUSE ERD2FC S10 1/4W 6R8J (U,J,C,A)
1-FR2E	ER-200595	Δ R FUSE ERD2FC S10 1/4W 5R6J (E,B,S)
1-MB1	EH-349274	COMP R EXB-P86223K
1-R2,3	ER-346175	R MF H F10 1/4W 2001F
1-R98	ER-333698	Δ R CB H S15 FS RDS 1/2W 821J
1-R99	ER-333598	Δ R CB H S15 FS RDS 1/2W 102J
1-R111	ER-341633	Δ R OMF H SNP FS 1W 680J
1-C39	EC-336875	C EC V CUT SR 102M 25DC
1-F1	EF-300604	Δ FUSE FST3100 T 250V 1.00A (E,B,S)

### SIZE SENSOR (LED) P.C BOARD

1-SW1B	ES-344473	SW PUSH SCL101T 1-01-02N
1-C3B	EC-341878	C EC V F05 NP 04W 100W 25.0DC

### POWER SUPPLY P.C BOARD

1-SW1C	ES-337898	Δ SW SLIDE 00120163 01-2(U)
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REF. NO.	PARTS NO.	DESCRIPTION
<b>MOVING P.C BOARD</b>		
1-VR1D	EV-344465	R S-FIX H TM8KV2-3S 3P 0.50W 203
<b>SIZE SENSOR (PTR) P.C BOARD</b>		
1-PH1E,2E	ET-337891	PHOTO SENSOR PH101
<b>FRONT LED P.C BOARD</b>		
1-D1F	ED-337893	D LED SLP144D01 RED
1-D2F	ED-337894	D LED SLP444D01 AMBER
1-1F	SE-349259	ESCUTCHEON FRONT (EXCEPT CS)
1-2F	SE-349259B	ESCUTCHEON FRONT-S(CS)
<b>ARM POSITION SENSOR (PTR) P.C BOARD</b>		
1-PH1G,2G	ET-349755	PHOTO SENSOR SPS103
1-1G	MZ-B344535	HOLDER POSITION SENSOR PART
<b>ARM POSITION SENSOR (LED) P.C BOARD</b>		
1-D1H	ED-349756	D LED SLR902A INFRARED
<b>TRACKING SENSOR P.C BOARD</b>		
1-D1J	ET-344472	PHOTO SENSOR ON1128AK
<b>TRANSISTOR P.C BOARD</b>		
1-IC1K	EI-315243	Δ IC TA78005P
1-TR1K	ET-349285	Δ TR 2SD1406 Y
<b>SWITCH (A) P.C BOARD</b>		
1-SW1Mto4M	ES-336780	SW TACT KHH10902
<b>SWITCH (B) P.C BOARD</b>		
1-SW5N,6N	ES-336780	SW TACT KHH10902

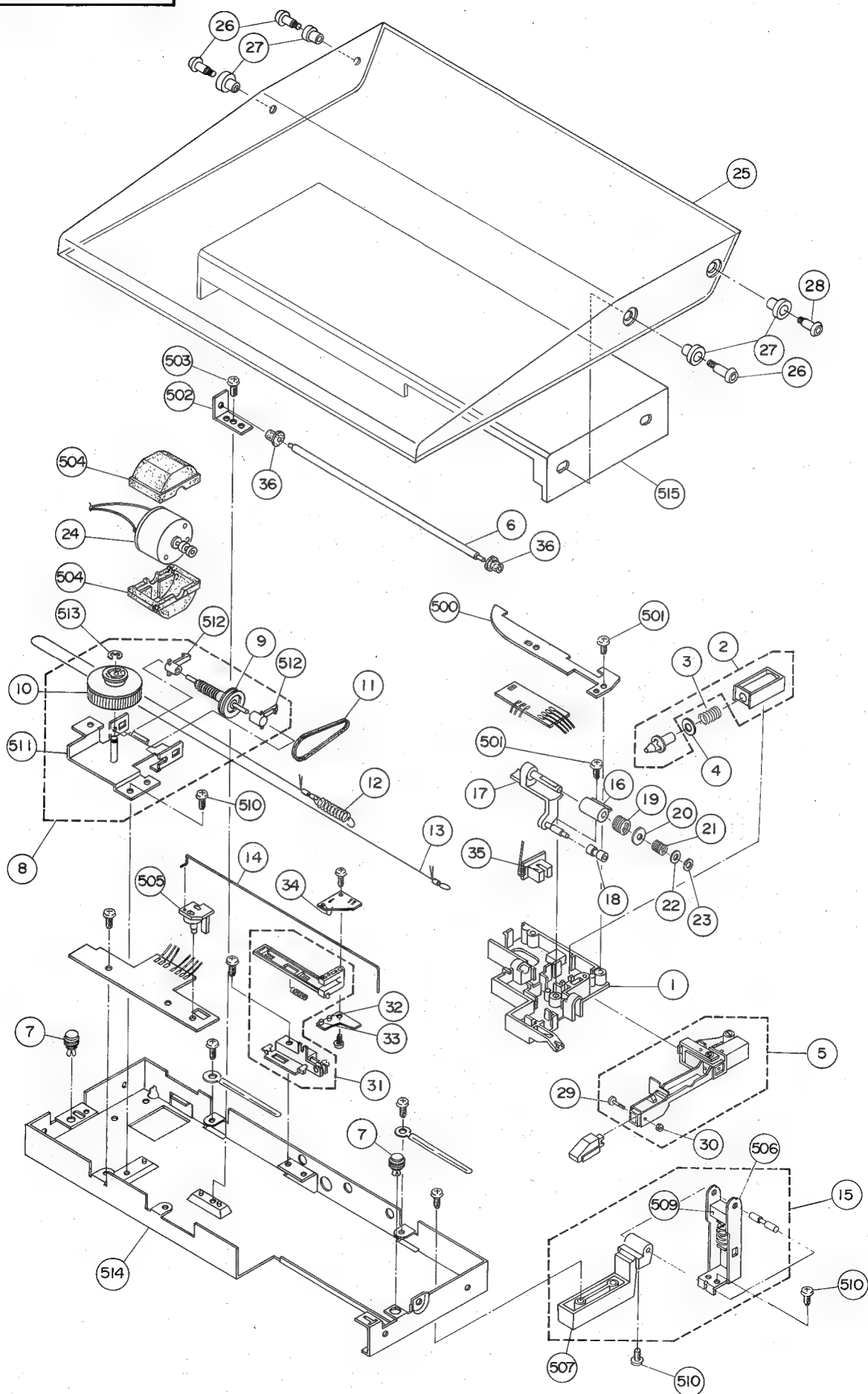
## 2. ASSEMBLY BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
<b>CHASSIS UPPER BLOCK</b>		
2-1	MZ-B349253	CHASSIS TRACKING PART
2-2	EP-349297	SOLENOID 0531PLT 10V
2-3	ZG-351560	SP PUSH PLUNGER
2-4	ZW-288764	PW51×078×020PBR
2-5	TP-349309	TONE ARM AP-M33
2-6	MS-349220	GUIDE RAIL
2-7	MR-308836	PULLEY
2-8	MZ-P1036A090A	CHASSIS GEAR BLK AP-M33-C
2-9	MI-B349223	GEAR WARM PART
2-10	MI-349224	GEAR TRACKING
2-11	MB-344538	BELT 1.2×D26.0CRHS60 5 82M
2-12	ZG-313046	SP T1-5.0/0.55-28.0 T1-159
2-13	EZ-349232	STRIGN WIRE
2-14	EZ-349230	WIRE REJECT
2-15	TP-P1036A080A	HINGE BLK AP-M33-C
2-16	TP-349226	HOLDER ELEVATION
2-17	TP-B349229	ARM ELEVATION PART
2-18	MH-344509	PROP 1 ELEVATION
2-19	ZG-349235	SP TORSION ELEVATION
2-20	ZW-420682	PW42×090×050NYL
2-21	ZS-349236	SP PUSH ELEVATION
2-22	ZW-550642	PW31×080×050STL CMT
2-23	ZW-653163	RING CS280STL PKR
2-24	BM-349296	MOTOR MMN-5C2RG D1.2W(M902)
<b>ASSEMBLY BLOCK</b>		
2-25	BC-B349261	DUST COVER PART
2-25S	BC-B349261B	DUST COVER-S PART
2-26	ZS-349252	SCREW
2-27	EZ-349251	BUSH COVER
2-28	ZS-349252B	SCREW (B)
2-29	ZS-712984	SET CARTRIDGE
2-30	ZW-712983	N2BRS 3
<b>ARM POSITION SENSOR (PTR) P.C BOARD</b>		
2-31	MZ-B344535	HOLDER POSITION SENSOR PART
2-32,33	ET-349755	PHOTO SENSOR SPS103
<b>ARM POSITION SENSOR (LED) P.C BOARD</b>		
2-34	ED-349756	D LED SLR902A INFRARED
<b>TRACKING SENSOR P.C BOARD</b>		
2-35	ET-344472	PHOTO SENSOR ON1128AK
2-36	MB-349221	BUSH GUIDE

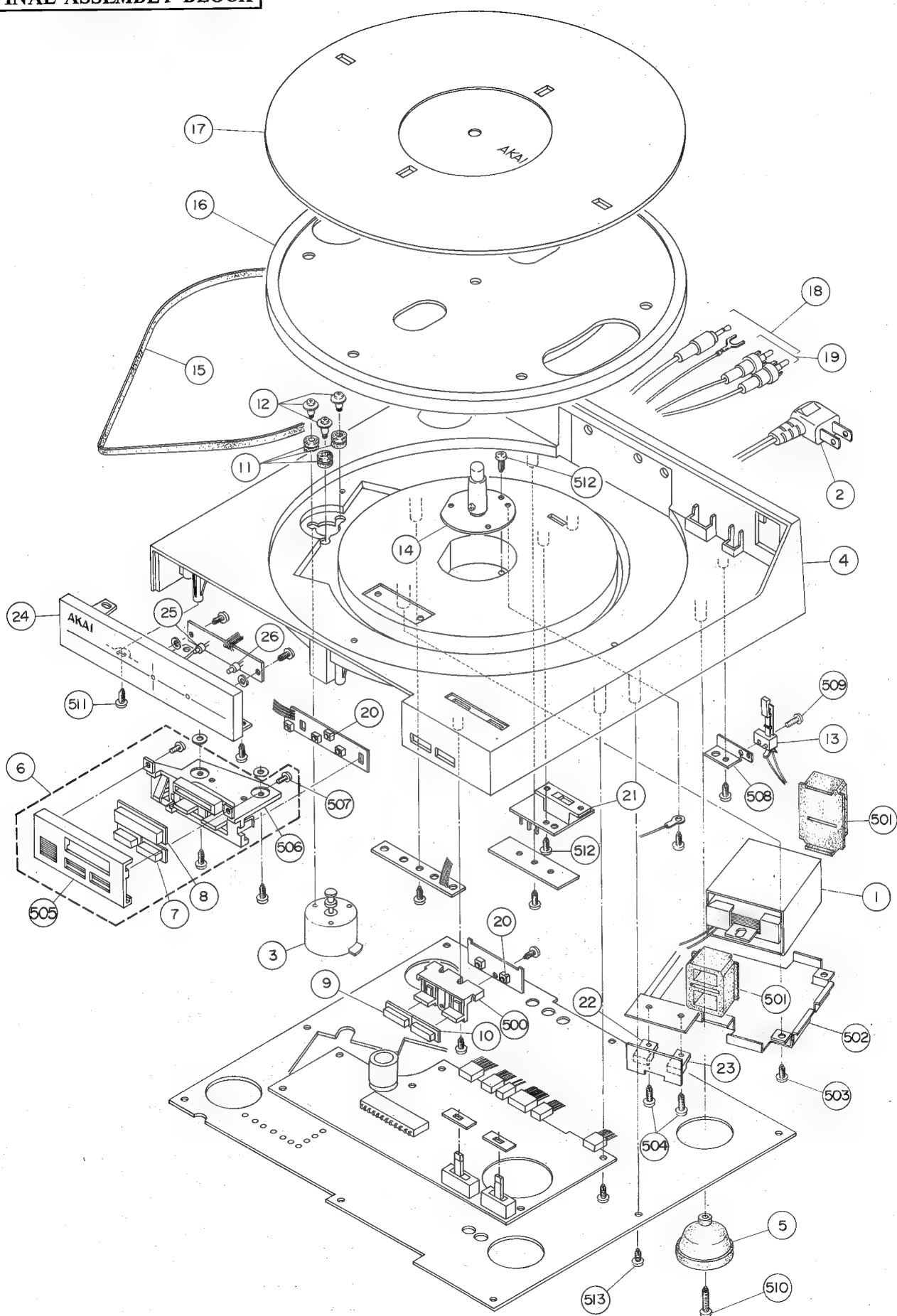
NOTE: Parts listed in 1 to 36 on the exploded view and list are normally stocked for replacement purpose.

The remaining parts shown in this manual are not normally stocked, because they are not seldom required for routine service.

# ASSEMBLY BLOCK



# FINAL ASSEMBLY BLOCK



# INDEX

PARTS NO.	REF. NO.	PARTS NO.	REF. NO.	PARTS NO.	REF. NO.	PARTS NO.	REF. NO.
BA-P1036A020A	1-1U	ET-337891	1-PH2E	SE-349259B	1-2F		
BA-P1036A020B	1-1J	ET-337891	1-PH1E	SE-349259B	3-24S		
BA-P1036A020C	1-1E	ET-338565	1-TR27	SK-349245	3-8		
BA-P1036A020D	1-1SU	ET-338565	1-TR28	SK-349345B	3-8S		
BA-P1036A020E	1-1SC	ET-338565	1-TR33	SK-349246	3-7		
BA-P1036A020F	1-1SE	ET-344472	1-D1J	SK-349246B	3-7S		
BA-P1036A020G	1-1C	ET-344472	2-35	TP-B349229	2-17		
BC-B349261	2-25	ET-347738	1-TR10	TP-P1036A080A	2-15		
BC-B349261B	2-25S	ET-347738	1-TR12	TP-348321	3-16		
BC-349267	3-4	ET-347738	1-TR37	TP-349226	2-16		
BC-349267B	3-4S	ET-349272	1-TR9	TP-349254B	3-17		
BD-P1036A100A	3-6	ET-349272	1-TR11	TP-349309	2-5		
BD-P1036A100B	3-6S	ET-349272	1-TR38	TP-349346	3-14		
BM-349286	3-3	ET-349272	1-TR26	ZG-313046	2-12		
BM-349296	2-24	ET-349285	1-TR1K	ZG-349235	2-19		
BT-349291	3-1J	ET-349285	3-23	ZG-351560	2-3		
BT-349292	3-1U	ET-349755	1-PH1G	ZS-349236	2-21		
BT-349293	3-1C	ET-349755	1-PH2G	ZS-349252	2-26		
BT-349294	3-1E	ET-349755	2-32	ZS-349252B	2-28		
BT-349295	3-1B	ET-349755	2-33	ZS-350767	3-12		
EC-336875	1-C39	ET-635231	1-TR22	ZS-712984	2-29		
EC-341878	1-C3B	ET-635231	1-TR6	ZW-288764	2-4		
ED-305704	1-D1	ET-635231	1-TR27	ZW-420682	2-20		
ED-306012	1-D4	ET-635231	1-TR24	ZW-550642	2-22		
ED-306724	1-D11	ET-635231	1-TR7	ZW-653163	2-23		
ED-306724	1-D12	ET-635231	1-TR29	ZW-712983	2-30		
ED-306724	1-D13	ET-635231	1-TR30				
ED-322238	1-D10	ET-635231	1-TR35				
ED-337266	1-D8	ET-635231	1-TR31				
ED-337893	1-D1F	ET-635231	1-TR32				
ED-337893	3-25	ET-635231	1-TR34				
ED-337894	1-D2F	ET-635231	1-TR1				
ED-337894	3-26	ET-635231	1-TR13				
ED-343996	1-D9	ET-635231	1-TR14				
ED-344280	1-D3	ET-635231	1-TR39				
ED-344280	1-D2	ET-635231	1-TR40				
ED-344280	1-D5	ET-635231	1-TR41				
ED-344280	1-D7	ET-635231	1-TR2				
ED-344280	1-D6	ET-635231	1-TR17				
ED-344464	1-D1B	ET-635231	1-TR18				
ED-344464	1-D2B	ET-635231	1-TR4				
ED-349756	1-D1H	ET-635231	1-TR19				
ED-349756	2-34	ET-635231	1-TR20				
EF-300604	1-F1	ET-635231	1-TR5				
EH-349274	1-MB1	ET-635231	1-TR21				
EI-315243	1-IC1K	EV-336847	1-VR2				
EI-315243	3-22	EV-336853	1-VR1				
EI-336761	1-IC2	EV-344465	1-VR1D				
EI-337017	1-X1	EW-201515	3-2S				
EI-344461	1-IC1	EW-207742	3-2C				
EI-349271	1-IC3	EW-313882	3-2E				
EO-345922	1-L1	EW-325489	3-19				
EP-349297	2-2	EW-347023	3-2B				
EQ-322437	1-RL1	EW-349289	3-18				
ER-200595	1-FR2E	EW-349551	3-2J				
ER-307565	1-FR1	EW-349552	3-2U				
ER-307565	1-FR2U	EW-374894	3-2SU				
ER-333598	1-R99	EZ-349230	2-14				
ER-333698	1-R98	EZ-349232	2-13				
ER-341633	1-R111	EZ-349251	2-27				
ER-346175	1-R2	MB-344538	2-11				
ER-346175	1-R3	MB-345351	3-11				
ES-336780	1-SW1M	MB-349221	2-36				
ES-336780	1-SW2M	MB-353713	3-15				
ES-336780	1-SW3M	MH-3445-9	2-18				
ES-336780	1-SW4M	MI-B349223	2-9				
ES-336780	1-SW5N	MI-349224	2-10				
ES-336780	1-SW6N	MR-308836	2-7				
ES-336780	3-20	MS-349220	2-6				
ES-336814	3-13	MZ-B344535	1-1G				
ES-337898	1-SW1C	MZ-B344535	2-31				
ES-337898	3-21	MZ-B349253	2-1				
ES-344473	1-SW1B	MZ-P1036A090A	2-8				
ES-349277	1-SW8	SA-336281B	3-5				
ES-352307	1-SW7	SB-349247A	3-10				
ET-325501	1-TR25	SB-349247B	3-9				
ET-325501	1-TR15	SB-349247C	3-10S				
ET-325501	1-TR16	SB-349247D	3-9S				
ET-325501	1-TR3	SE-349259	1-1F				
ET-337759	1-TR8	SE-349259	3-24				

### 3. FINAL ASSEMBLY BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
<b>FINAL ASSEMBLY BLOCK</b>		
3-1U	BT-349292	△ TRANS POWER APT-33-70(U) (T901)
3-1J	BT-349291	△ TRANS POWER APT-33-10(J) (T901)
3-1C	BT-349293	△ TRANS POWER APT-33-30(C,A) (T901)
3-1E	BT-349294	△ TRANS POWER APT-33-40(E) (T901)
3-1B	BT-349295	△ TRANS POWER APT-33-50(B,S) (T901)
3-2U	EW-349552	△ AC CORD 2 CORES KP-224, VFF PL-3 U/T(U)
3-2SU	EW-374894	△ AC CORD 2 CORES VM-0129A, VFF U/T(U)
3-2J	EW-349551	△ AC CORD 2 CORES KP-224, VFF PL-3J (J)
3-2C	EW-207742	△ AC CORD 2 CORES VM-0238, SPT-1 UC (C,A)
3-2E	EW-313882	△ AC CORD 2 CORES KP-419C, LTCE-2F E (E)
3-2B	EW-347023	△ AC CORD LTBS-2F 42/0.15×2 H (B)
3-2S	EW-201515	△ AC CORD 2 CORES KP-560, LTSA-2F S (S)
3-3	BM-349286	MOTOR MMI-5P2R-1 D0.03 (M901)
3-4	BC-349267	CABINET
3-4S	BC-349267B	CABINET-S
3-5	SA-336281B	INSULATOR (B)
3-6	BD-P1036A100A	CAP POWER BLK AP-M33-C
3-6S	BD-P1036A100B	CAP POWER BLK AP-M33-CS
3-7	SK-349246	CAP KNOB (B)
3-7S	SK-349246B	CAP KNOB (B)-S
3-8	SK-349245	CAP KNOB (A)
3-8S	SK-349245B	CAP KNOB (A)-S
3-9	SB-349247B	CAP KNOB (D)
3-9S	SB-349247D	CAP KNOB (D)-S
3-10	SB-349247A	CAP KNOB (C)
3-10S	SB-349247C	CAP KNOB (C)-S
3-11	MB-345351	RUBBER CUSHION
3-12	ZS-350767	SCREW
3-13	ES-336814	SW LEAF MSW-1150NBK 01-1 NO (SW901)
3-14	TP-349346	SPINDLE ASSY
3-15	MB-353713	BELT 4.0×0.8×D201CRHS60
3-16	TP-348321	PLATTER
3-17	TP-349254B	TABLE SHEET (B)
3-18	EW-349289	CORD UL 3P AUDIO
3-19	EW-325489	CORD P-54-075 2P AUDIO (AP-M33CS/S)
<b>SWITCH (A) P.C BOARD</b>		
3-20	ES-336780	SW TACT KHH10902
<b>POWER SUPPLY P.C BOARD</b>		
3-21	ES-337898	△ SW SLIDE 00120163 01-2 (SW1) (U)
<b>TRANSISTOR P.C BOARD</b>		
3-22	EI-315243	△ IC TA78005P
3-23	ET-349285	△ TR 2SD1406 Y
<b>FRONT LED P.C BOARD</b>		
3-24	SE-349259	ESCUTCHEON FRONT
3-24S	SE-349259B	ESCUTCHEON FRONT-S
3-25	ED-337893	D LED SLP144D01 RED (D1)
3-26	ED-337894	D LED SLP444D01 AMBER (D2)

NOTE: Parts listed in 1 to 26 on the exploded view and list are normally stocked for replacement purpose.

The remaining parts shown in this manual are not normally stocked, because they are not seldom required for routine service.

#### SYMBOL FOR DESTINATION

A : AAL (U.S.A)  
 B : UK (England)  
 C : CSA (Canada)  
 J : JPN (Japan)  
 S : SAA (Australia)  
 U : U/T (Universal Area)  
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#### SYMBOL FOR COLOR VARIATION

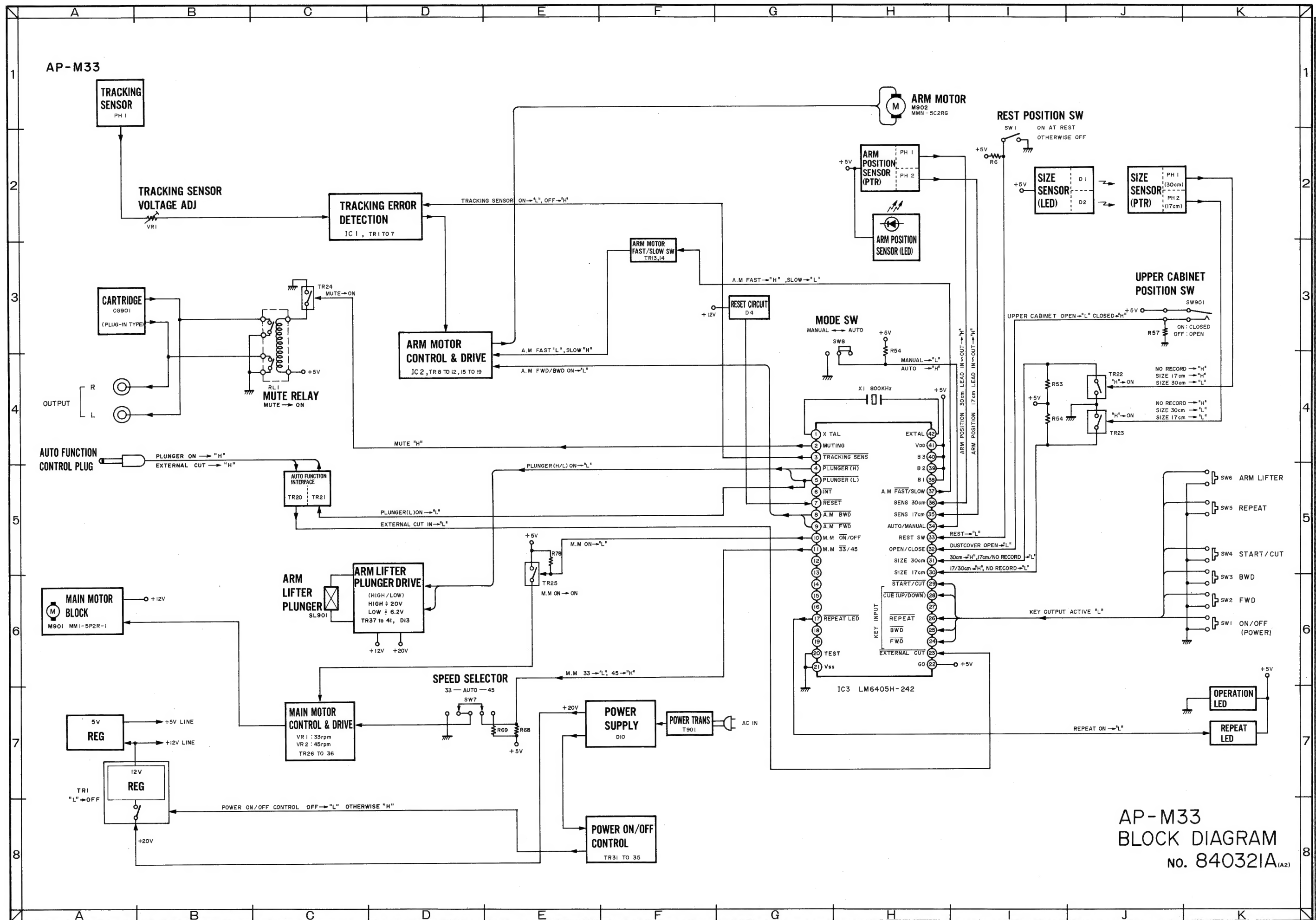
S : SILVER

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# **AKAI**

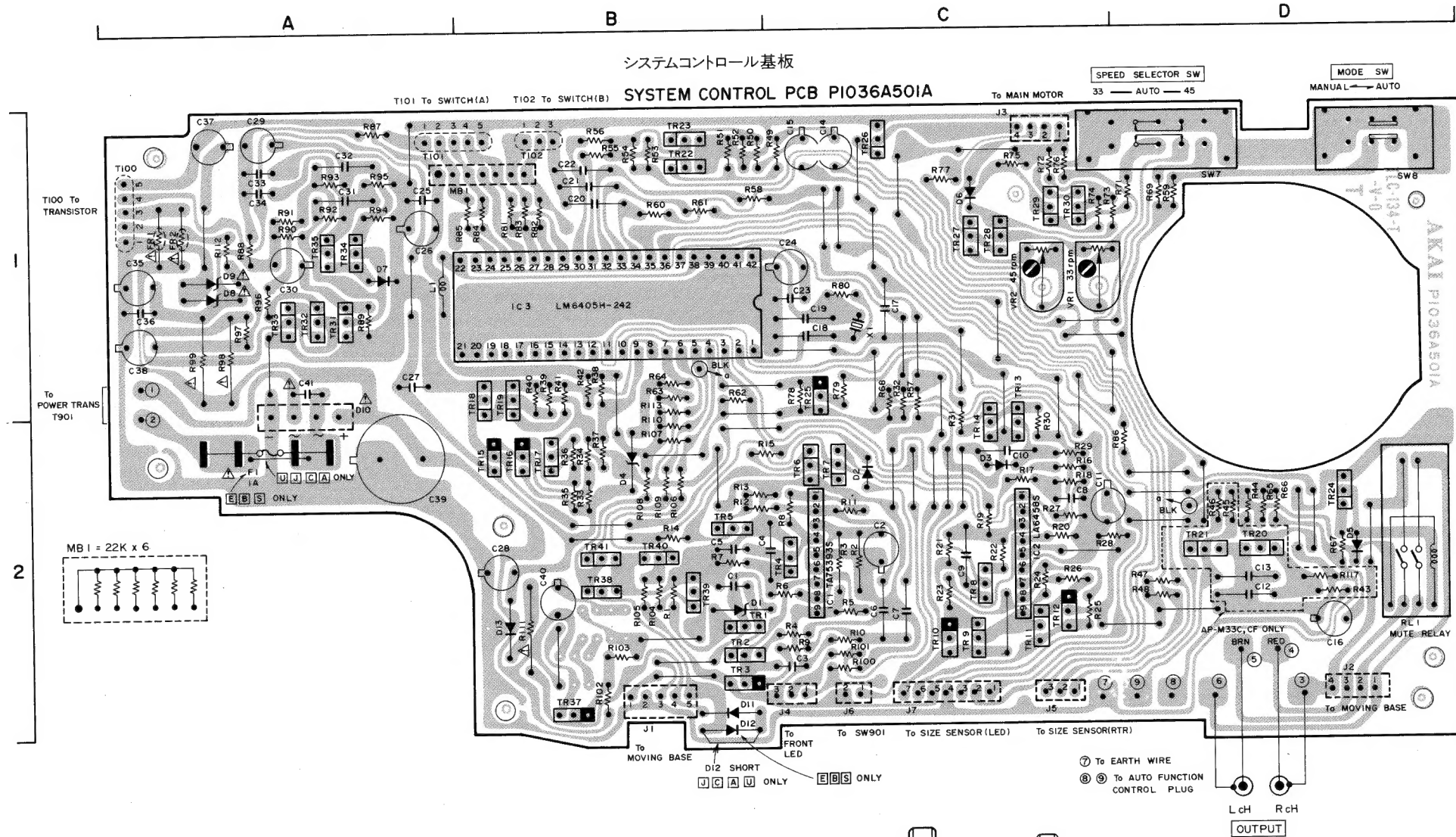
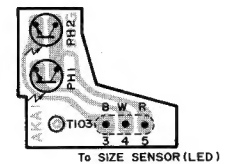
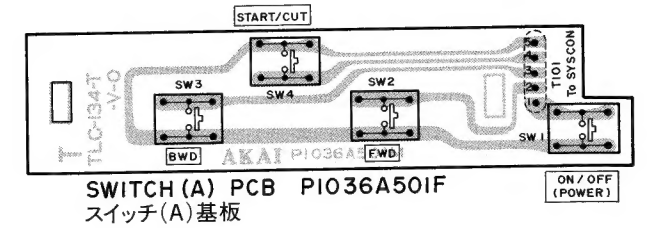
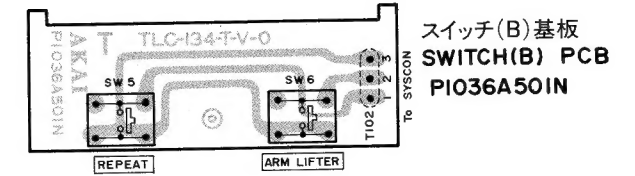
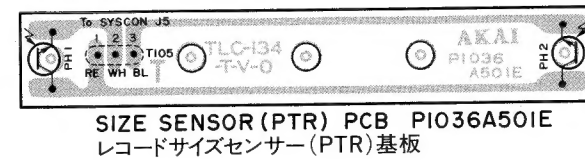
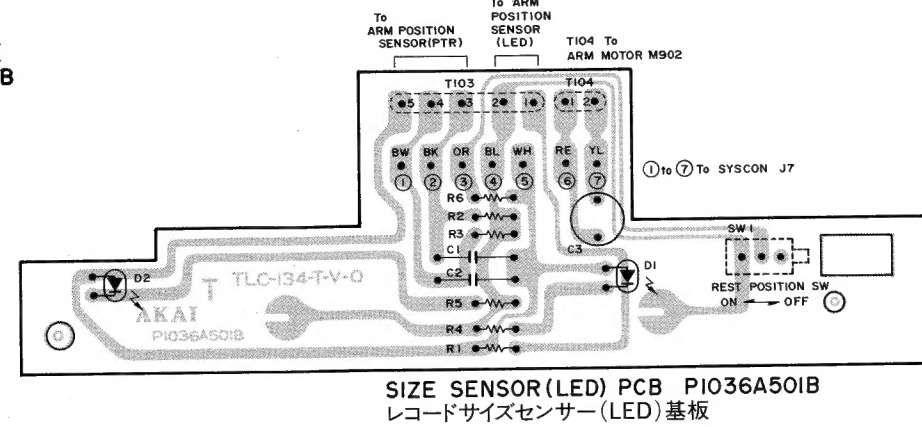
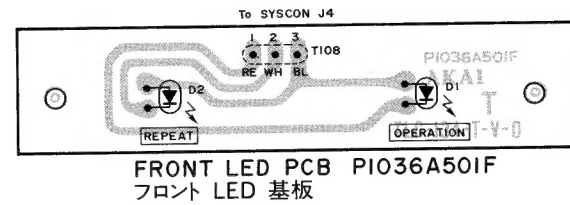
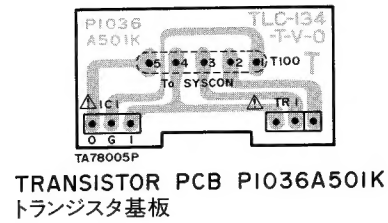
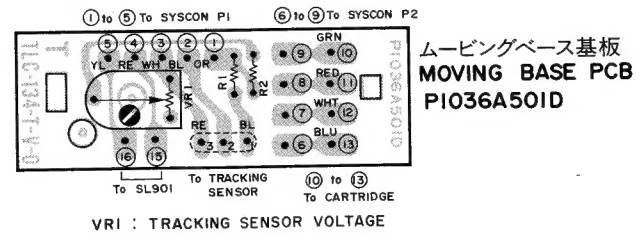
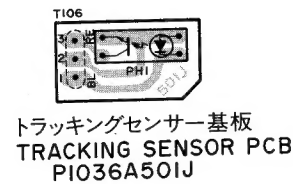
## **MODEL AP-M33**

### **P.C BOARDS SCHEMATIC DIAGRAM**



AP-M33  
BLOCK DIAGRAM  
no. 840321A(A2)





LOCATION OF COMPONENTS

<IC>

- IC 1-----C2
- IC 2-----C2
- IC 3-----B1

<TR>

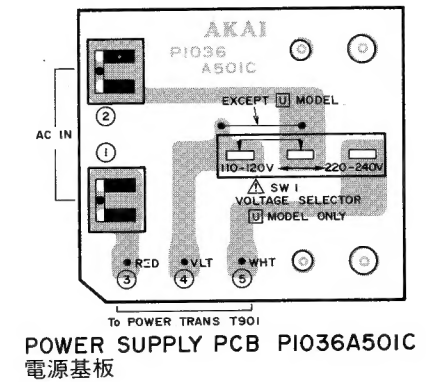
- TR 1-----B2
- TR 2-----B2
- TR 3-----B2
- TR 4-----C2
- TR 5-----B2
- TR 6-----C2
- TR 7-----C2
- TR 8-----C2
- TR 9-----C2
- TR 10-----C2
- TR 11-----C2
- TR 12-----C2
- TR 13-----C2
- TR 14-----C2
- TR 15-----B2
- TR 16-----B2
- TR 17-----B2
- TR 18-----B1
- TR 19-----B1
- TR 20-----D2
- TR 21-----D2
- TR 22-----B1

<TERMINAL>

- J1-----B2
- J2-----D2
- J3-----C1
- J4-----C2
- J5-----C2
- J6-----C2
- J7-----C2

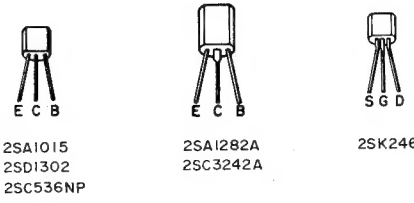
- TR23-----B1
- TR24-----D2
- TR25-----C1
- TR26-----C1
- TR27-----C1
- TR28-----C1
- TR29-----C1
- TR30-----C1
- TR31-----A1
- TR32-----A1
- TR33-----A1
- TR34-----A1
- TR35-----A1
- TR36-----B2
- TR37-----B2
- TR38-----B2
- TR39-----B2
- TR40-----B2
- TR41-----B2
- TR42-----B2
- TR43-----B2

- ①-----A1
- ②-----A1
- ③-----D2
- ④-----D2
- ⑤-----D2
- ⑥-----D2
- ⑦-----C2
- ⑧-----D2
- ⑨-----D2



B  
●●● = NPN TRANSISTOR  
●●● = PNP TRANSISTOR

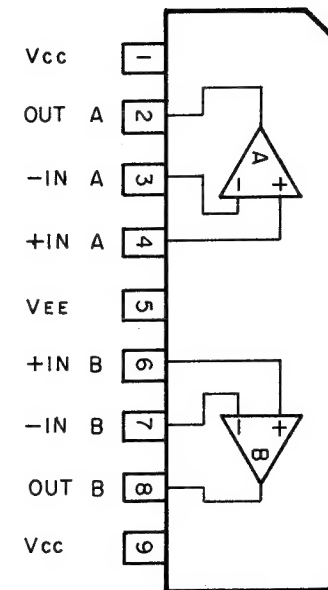
- TR 1, 2, 4 to 7, 13, 14, 17 to 24  
29 to 32, 34, 35, 39 to 41 -----2SC536NP(F,G)
- TR 9, 11, 26, 38 -----2SC3242A(E,F)
- TR 3, 15, 16, 25 -----2SA1015(O,Y)
- TR 10, 12, 37 -----2SA1282A(E,F)
- TR 27, 28, 33 -----2SD1302(R,S)
- TR 8 -----2SK246 (GR)



VR1 : 33-1/3 rpm SPEED ADJ  
VR2 : 45 rpm SPEED ADJ

注意: △の付された部品は、安全上重要部品です。交換の際は、指定部品以外は使用しないこと。  
WARNING: △ INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.  
AVERTISSEMENT: △ IL INDIQUE LES COMPOSANTS CRITIQUES DE SURETE. POUR MAINTENIR LE DEGRE DE SECURITE DE L'APPAREIL, NE REMPLACER LES COMPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SECURITE QUE PAR DES PIECES RECOMMANDEES PAR LE FABRICANT.

LA6458S (Dual Operational Amp)  
TA75393S (Dual Comparator)



TERMINAL DESCRIPTION OF IC LM6405H-242 (4 Bit Micro Computer)

Pin No.	Symbol	Description
1	X'tal	Crystal OSC input (800 kHz)
2	MUTING	Muting at "H" ("L" while the stylus is on the record)
3	TRACKING SENS	Tracking Sensor ON/OFF signal output, Tracking Sensor is ON at "L" while playing the record and OFF at "H" in the other conditions.
4	PLUNGER (H)	Plunger High Drive output, "H" when Tone Arm rises and while Tone Arm is up, "L" for 1.5 sec after Tone Arm starts to descend and "H" after that 1.5 sec.
5	PLUNGER (L)	Plunger Drive output, "H" when Tone Arm rises and while Tone Arm is up. "L" when Tone Arm descends and while Tone Arm is down.
6	INT	Not used and connected to +5V.
7	RESET	Reset at "L" when power is turned on.
8	A.M BWD	Arm Motor Backward output, "L" only while Tone Arm is moving away from the Spindle.
9	A.M FWD	Arm Motor Forward output, "L" only while Tone Arm is moving towards the Spindle.
10	M.M ON/OFF	Main Motor ON/OFF output, "H" at Stop mode "L" at Play mode
11	M.M 33/45	Main Motor Speed 33/45 output, "L" at 33-1/3 rpm "H" at 45 rpm

Pin No.	Symbol	Description
12	E0	Speed 33-1/3 rpm
13	E1	Speed 45 rpm
14	E2	Size 30 cm
15	E3	Size 17 cm
16	F0	Start
17	REPEAT LED	Repeat
18	F2	Arm Up
19	F3	Arm Down
20	TEST	Connected to ground
21	VSS	
22	G0	Not used and connected to +5V.
23	EX CUT	External cut input from Auto Function Control Plug
24	FWD	Forward Key signal input
25	BWD	Backward Key signal input
26	SPEED	Speed Key signal input (Not used)
27	REPEAT	Repeat Key signal input
28	CUE (UP/DOWN)	Cue (UP/DOWN) Key signal input
29	START/CUT	Start/Cut Key signal input
30	SIZE (17cm)	Size Sensor 17 cm (SIZE 1) input, "L" as no record is on, otherwise "H".
31	SIZE (30cm)	Size Sensor 30 cm (SIZE 2) input, "L" for SIZE 17 cm "H" for SIZE 30 cm.
32	OPEN/CLOSE	Open/Close (Dust Cover SW) input, "L" when SW is open. (DUST COVER is open) "H" when SW is closed. (DUST COVER is closed)
33	REST	Arm Rest SW input "L" while Tone Arm is in Rest (Stand-by) position. "H" while Tone Arm is out of Rest position.
34	AUTO/MANUAL	Auto/Manual SW input "H" at Auto mode, "L" at Manual mode
35	SENS (17cm)	Arm Sensor 17 cm (SENS 1) "H" while the Tone Arm is located between the Lead-in and the Lead-out position for 17 cm record. Otherwise "L".
36	SENS (30cm)	Arm Sensor 30 cm (SENS 2) "H" while the Tone Arm located between the Lead-in and the Lead-out position for 30 cm record. Otherwise "L".
37	A.M FAST/SLOW	Arm Motor FAST/SLOW "L" at Fast mode when FWD/BWD button is depressed for more than 0.99 sec. "H" at Slow mode when FWD/BWD button is depressed for less than 0.99 sec.
38	B1	Dust Cover Position SW Preset, connected to +5V to be effective.
39	B2	Plunger High Drive Preset & Muting/Tracking Sensor Timer Preset, Set the timing while Plunger is driven by the high voltage, and also the timing of Muting (OFF)/Tracking Sensor (ON). Connected to +5V to set these timings to 1.5 seconds.
40	UP (H)	Arm Up Timer Preset (UPH) input, Set the timing of next action after the Tone Arm starts to rise. Connected to +5V to set the timing to 2.012 sec.
41	VDD	Power Supply Terminal (+5V)
42	EX'tal	Crystal OSC input (800 kHz)